

CLAIMS

The invention claimed is:

1. An electro-optic device comprising:
an electro-optic element having a variable transmittance, said electro-optic element having a front surface and a rear surface; and
a hydrophilic optical coating disposed on the front surface of said electro-optic element,
5 said coating comprising a color suppression coating and a layer of a photocatalytic material.
2. The electro-optic device as defined in claim 1, wherein said color suppression coating comprises a first layer having a high refractive index and a second layer having a low refractive index.
3. The electro-optic device as defined in claim 2, wherein said first layer of said color suppression coating includes titanium dioxide.
4. The electro-optic device as defined in claim 3, wherein said second layer of said color suppression coating includes silicon dioxide.
5. The electro-optic device as defined in claim 1, wherein said photocatalytic layer comprises titanium dioxide.

6. The electro-optic device as defined in claim 1, wherein said electro-optic element is an electrochromic element including a reflective surface so as to function as an electrochromic mirror.
7. The electro-optic device as defined in claim 6, wherein said electrochromic element includes an electrochromic medium having a color that it is less absorbing of green light than other colors of light when the electrochromic element is activated.
8. The electro-optic device as defined in claim 1, wherein said electro-optic device exhibits a C* value of less than about 25.
9. The electro-optic device as defined in claim 1, wherein said electro-optic device has a C* value less than about 20.
10. The electro-optic device as defined in claim 1, wherein said electro-optic device has a C* value less than about 15.
11. The electro-optic device as defined in claim 1, wherein said electro-optic device has a C* value less than about 10.

12. The electro-optic device as defined in claim 1, wherein said color suppression coating includes a layer of a material having a refractive index intermediate that of the titanium dioxide layer and of a substrate of said mirror element on which said hydrophilic coating is applied.
13. The electro-optic device as defined in claim 12, wherein said layer of intermediate refractive index comprises SnO_2 .
14. The electro-optic device as defined in claim 12, wherein said layer of intermediate refractive index is a transparent electrically conductive material.
15. The electro-optic device as defined in claim 14, wherein said transparent electrically conductive material is selected from the group including ITO, fluorine-doped tin oxide, ZnO , and mixtures thereof.
16. The electro-optic device as defined in claim 1 and further including a second layer of photocatalytic material disposed on the front of the first photocatalytic layer and having a refractive index less than that of the first photocatalytic layer.
17. The electro-optic device as defined in claim 1 and further including a second layer of photocatalytic material disposed on the front of the first photocatalytic layer and having a refractive index less than that of the first photocatalytic layer, wherein said color suppression coating includes a layer of a material having a refractive index intermediate of the first

5 photocatalytic layer and a substrate of said mirror element on which said hydrophilic coating is applied.

18. The electro-optic device as defined in claim 17, wherein said first and second photocatalytic layers comprise titanium dioxide.

19. The electro-optic device as defined in claim 17, wherein said layer of intermediate refractive index comprises SnO_2 .

20. The electro-optic device as defined in claim 17, wherein said layer of intermediate refractive index is a transparent electrically conductive material.

21. The electro-optic device as defined in claim 20, wherein said transparent electrically conductive material is selected from the group including ITO, fluorine-doped tin oxide, ZnO , and mixtures thereof.

22. The electro-optic device as defined in claim 17 and further including a layer of SiO_2 disposed on the photocatalytic layer.

23. The electro-optic device as defined in claim 1 and further including a layer of SiO_2 disposed on the photocatalytic layer.

24. A rearview mirror for a vehicle comprising:
a variable reflectance mirror element having a front surface and a rear surface; and
a transparent electrically conductive coating disposed on the front surface of said mirror element.

25. The rearview mirror of claim 24 further comprising a hydrophilic coating disposed on said transparent electrically conductive coating.

26. The rearview mirror of claim 24, where said variable reflectance mirror element is an electrochromic mirror element.

27. The rearview mirror of claim 26, where said electrochromic mirror includes:
first and second substrates spaced apart and sealed to provide a sealed chamber therebetween, the front surface of said first substrate serves as the front surface of the mirror element, and the rear surface of said second substrate serves as the rear surface of the mirror element;
5 element;

a first electrode disposed on the rear surface of said first substrate;
a second electrode disposed on the front surface of said second substrate; and
an electrochromic medium disposed in the sealed chamber.

28. The rearview mirror of claim 27 further comprising a first clip electrically coupled to said first electrode and to said transparent electrically conductive coating, and a second clip coupled to said second electrode.

29. The rearview mirror of claim 28 further comprising an electrical conductor coupled to said transparent electrically conductive coating such that electrical current may flow through said electrical conductor, said transparent electrically conductive coating, and said first clip to thereby heat the front surface of said mirror element.

30. The rearview mirror of claim 26 further comprising a hydrophilic coating disposed on said transparent electrically conductive coating.

31. The rearview mirror of claim 24 further comprising first and second electrical conductors coupled to said transparent electrically conductive coating such that electrical current may flow through said first electrical conductor, said transparent electrically conductive coating, and said second electrical conductor to thereby heat the front surface of the
5 mirror.

32. The rearview mirror of claim 31 and further comprising a hydrophilic coating disposed on said transparent electrically conductive coating.

33. A variable transmittance window comprising:

first and second spaced apart transparent elements;

a variable transmittance element positioned between said first and second transparent elements; and

5 a hydrophilic coating disposed over an outer surface of said first transparent element.

34. The variable transmittance window as defined in claim 33, where said variable transmittance element is an electrochromic element.
35. The variable transmittance window as defined in claim 33, where said hydrophilic coating includes a layer of a photocatalytic material.
36. The variable transmittance window as defined in claim 35, where said photocatalytic layer comprises TiO_2 .
37. The variable transmittance window as defined in claim 33, where said hydrophilic coating includes a layer of SiO_2 .
38. The variable transmittance window as defined in claim 33, where said hydrophilic coating includes a color suppression coating.
39. The variable transmittance window as defined in claim 33 and further including a layer of a transparent electrically conductive material disposed between said outer surface of said first transparent element and said hydrophilic coating.
40. An electrochromic element comprising:
first and second substrates spaced apart and sealed to provide a sealed chamber therebetween, the front surface of said first substrate serves as the front surface of the

electrochromic element, and the rear surface of said second substrate serves as the rear surface
5 of the electrochromic element;

a first electrode disposed on the rear surface of said first substrate;

a second electrode disposed on the front surface of said second substrate; and

an electrochromic medium disposed in the sealed chamber, wherein said electrochromic
medium having a color such that, when combined with said first substrate and said first
10 electrode, decreases C^* relative to a neutral colored electrochromic medium when the
electrochromic medium is activated.

41. An electrochromic element comprising:

first and second substrates spaced apart and sealed to provide a sealed chamber
therebetween, the front surface of said first substrate serves as the front surface of the
electrochromic element, and the rear surface of said second substrate serves as the rear surface
5 of the electrochromic element;

a first electrode disposed on the rear surface of said first substrate;

a color compensation layer disposed on a surface of said first substrate, said color
compensation layer having a refractive index intermediate that of said first electrode and said
first substrate;

10 a second electrode disposed on the front surface of said second substrate; and
an electrochromic medium disposed in the sealed chamber.

42. The electrochromic medium as defined in claim 41, wherein said first electrode is made
of indium tin oxide.

43. The electrochromic medium as defined in claim 41, wherein said first electrode has a half wave optical thickness.

44. The electrochromic medium as defined in claim 41, wherein said first electrode has a full wave optical thickness.

45. The electrochromic medium as defined in claim 41, wherein said color compensation layer has a quarter wave optical thickness.

46. The electrochromic medium as defined in claim 41, wherein said color compensation layer comprises Al_2O_3 .

47. A non-planar electrochromic mirror comprising:

first and second non-planar substrates spaced apart and sealed to provide a sealed chamber therebetween, the front surface of said first substrate serves as the front surface of the electrochromic element, and the rear surface of said second substrate serves as the rear surface

5 of the electrochromic element;

a first electrode disposed on the rear surface of said first substrate;

a second electrode disposed on the front surface of said second substrate;

an electrochromic medium disposed in the sealed chamber; and

a layer disposed on the front surface of said first substrate, said layer having a
10 refractive index higher than that of said first substrate so as to increase the reflectance of the
mirror when said electrochromic medium is activated.